

base. There is a considerable amount of brown pigment about the base of the leaf; and within the sporangium is a layer of brown amorphous matter, gelatinous when wet, which shows through the wall. The sculpture of the megaspore recalls that of *I. saccharata*, but the columns and ridges are much more numerous, and more slender and delicate.

DELAWARE COUNTY INSTITUTE OF SCIENCE,
MEDIA, PENNA.

New Tropical American Ferns—VIII¹

WILLIAM R. MAXON

The two new species here described are based on specimens collected rather recently in Panama. Both are exceedingly well marked.

45 *Adiantum cordatum* Maxon, sp. nov.

§ *Hewardia*. Habitu et nervis areolis plus minus elongatis omnino anastomosantibus *Adianto diphylo* proximum, quod pinnis manifeste petiolulatis late cuneatis nec incumbantibus cordatisque, sporangiorum annulo incrassato 18–20-articulato, sporis atris valde trigonis opacis satis recedit.

§ *Hewardia*. Rhizome short-creeping, 5–10 cm. long, about 5 mm. thick, roughly nodose from old pseudopodia, finely paleaceous; scales bright brown, about 2 mm. long, linear to lance-subulate, laxly ciliate at base, remotely so toward the filiform tip. Fronds 6 or 7, closely tristichous, rigidly ascending, 25–55 cm. long, the stipes mostly very much longer than the blades, 1–2 mm. thick, subterete, narrowly sulcate ventrally, atropurpureous, lustrous, finely paleaceous at extreme base, glabrescent; mature blades simple or simply pinnate, if simple elongate-cordate, 10–18 cm. long, 6–10 cm. broad, very

¹ Published by permission of the Secretary of the Smithsonian Institution.

deeply cordate at base, evenly long-acuminate at apex, the tip attenuate or caudate; if bipinnate developing only 1 or 2 lateral pinnae, these smaller than the terminal one, 8–11 cm. long, normally ovate, long-acuminate at apex, sessile, inequilateral, unequally cordate at base, the large rounded proximal portion incumbent upon the short slender atropurpureous rachis; costa nearly or quite percurrent, evident upon both surfaces, brown-sclerotic in the basal portion beneath, glabrous; veins elevated above, prominulous beneath, coarsely reticulate throughout, the areoles elongate, 5- to 7-seriate between costa and margin, successively smaller toward apex and sides, free excurrent veins minute or wanting, the marginal areoles very small; sterile margins entire or subentire; leaf tissue chartaceo-coriaceous, translucent, above dull gray-green, striolate between the veins, light or yellowish green beneath, glabrous; sori 2, each a continuous line extending from near the basal sinus nearly or quite to base of acumen, the closely revolute marginal portion of the leaf blade very narrow (about 0.5 mm.), the true indusium brownish, membranous, about 1 mm. broad, subentire or minutely erose; thickened annulus of sporangia 12- or 13-celled; spores triplanate, rounded-trilobate, about 40μ in diameter, yellowish, granular, subhyaline.

Type in the U. S. National Herbarium, nos. 679412 and 679413, collected in forest around Puerto Obaldía, San Blas coast, Panamá, altitude 50 meters or less, August, 1911, by H. Pittier (no. 4297). There is at hand also a small frond collected in the Canal Zone region in 1911 or 1912 by E. D. Christopherson (no. 404).

To be compared with *Adiantum diphyllum* (Fée) Maxon,² founded upon a specimen collected by Blanchet in the region of Bahia. That species, which as described and illustrated by Fée seems most distinct, has strangely been reduced to synonymy under *A. adiantoides* (J. Sm.) C. Chr., a large decomposed plant of utterly different

² *Hewardia diphylla* Fée, Crypt. Vasc. Brés. 1: 39. pl. 9, f. 3. 1869.

appearance. *A. diphyllum* resembles *A. cordatum* rather closely in its wholly areolate venation, but differs definitely in its distinctly petiolulate non-cordate pinnae, its 18- to 20-celled thickened annulus, and its dark, opaque, deeply 3-lobed spores. Both species depart widely from *A. Wilsoni* in their completely areolate venation.

Leptochilus Killipii Maxon, sp. nov.

Species diversa *L. oligarchico* mirabiliter olim confusa, a quo maxime recedit: statura minuscule, stipitibus gracillimis, laminis parvis debilioribus simplicibus, nervis (lateralibus exceptis) subimmersis tenuibus nec omnibus valde reticulatis crassisque.

Rhizome wide-creeping (10-25 cm.), 2-3 mm. thick, smooth, subangulate, flexuous, light brown, laxly and deciduously paleaceous; scales few, distant, brown, 3-5 mm. long, linear to lance-attenuate, distantly dentate, the teeth sometimes linear and gland-tipped. Fronds few (2 to 4), distant 1.5-10 cm., laxly ascending, the fertile usually surpassing the sterile. Sterile fronds 2 or 3, 25-30 cm. long, the stipes short (4-9 cm.), about 1 mm. thick, olivaceous, bearing a few lax deciduous scales; blades simple, lance-ovate to elliptic-lanceolate, acutely cuneate at base, acuminate or long-acuminate at apex, 20-26 cm. long, 4.5-7.5 cm. broad, entire, the slender costa strongly elevated on both sides; lateral veins 18-20 pairs, nearly straight, diverging from the costa at an angle of about 70°, prominulous; transverse connecting-veins arcuate, forming about 5 series of major areoles, these consisting of 3-5 diverse minor areoles, each with a few, simple or broadly forked, included veinlets; leaf tissue dark green above, slightly paler beneath, papyraceous, glabrous, translucent, the ultimate venation evident but scarcely prominulous. Fertile fronds solitary, 35-40 cm. long, delicate, the stipe 21-27 cm. long, slender, pale olivaceous, bearing a few distant scales; blade 13-14 cm. long, 1.5-2 cm. broad, lance-linear, narrowly attenuate both ways from the middle half, the extreme base decurrent; sporangia diffused, the free marginal zone 0.5-1 mm. broad, plane; spores subglobose, yellow-

ish, very broadly alate, about $70\ \mu$ in diameter (wings included).

Type in the U. S. National Herbarium, no. 1013101, collected near Juan Díaz, Panamá, alt. 75 meters, in wet forest ravine, January 13, 1918, by E. P. Killip (no. 2778). A second sheet of the same collection is almost identical, and there is also a sterile specimen from the vicinity of Frijoles, Canal Zone (Killip 2918). Otherwise the species is known only from a single Peruvian collection (Spruce 4636), to be mentioned further.

Baker's inadequate and misleading description of *Acrostichum oligarchicum* (*Leptochilus oligarchicus* C. Chr.) is based upon two Peruvian specimens, both collected by Spruce on Mount Guayrapurina. I have studied these at Kew. The first of them, no. 4737, collected in September, 1856, is a large, very robust, coarse plant with fully pinnate blades, the pinnae very strongly reticulate-veined; it is annotated by Baker, and must be regarded as the type specimen of his species. The second element, Spruce 4636, collected in July, 1855, is exactly our Panama plant, with delicate simple fronds. It is not annotated by Baker and is so utterly different that one wonders how it could possibly have been included in his concept of *A. oligarchicum*. Both specimens are represented by excellent photographs in the U. S. National Herbarium.

WASHINGTON, D. C.

Recent Fern Literature

Andersson-Kotto, Irma. "Variegation in three species of ferns." Zeitschrift für induktive Abstammungs- und Vererbungslehre. 1930 Bd. LVI Heft 2, p. 115-201.

The author of this paper has completed and published results of another extensive and intensive study of fern genetics. The report comprises nearly 100 pages with numerous illustrations. It may be noted that owing to